April 3, 1962 E. R. GOLL 3,028,036

BUNG OR STOPPER

Filed July 9, 1959

Fig. 1

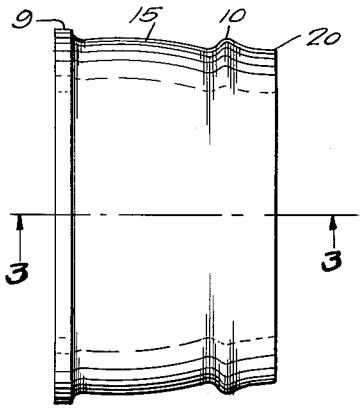
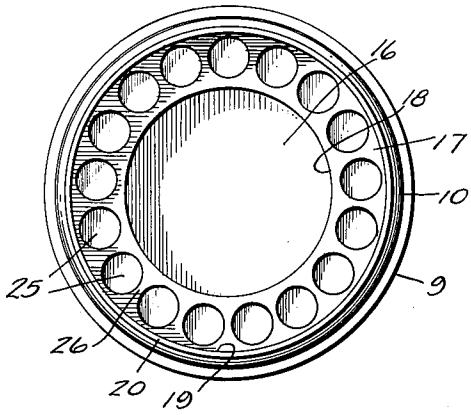


Fig. 2



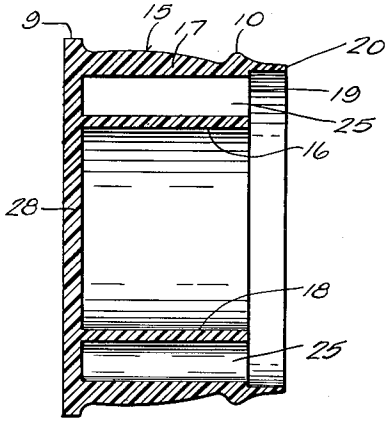


Fig. 3

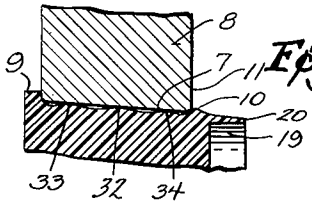


Fig. 4

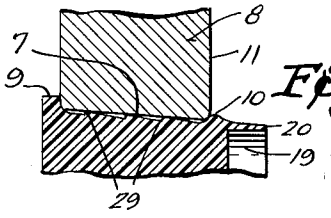


Fig. 5

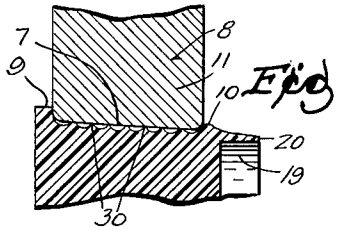


Fig. 6

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BUNG OR STOPPER

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2 Claims. (Cl. 217—110)

This invention relates to a bung or stopper desirably made of synthetic resin. One of the objectives is to provide a bung receivable into the conventional bung hole of a barrel to withstand all of the pressures to which the conventional wooden bung or stopper is subject. Barrels are commonly tested to 100 pounds to the square inch.

The bung embodying the present invention is of such length as to extend through the bung hole and is provided with a yieldable terminal portion having a rib which expands to engage the bung hole plate at the inner end of the bung hole. Externally, a flange seats against the outside of the plate.

Intermediate its terminal annular flanges, the stopper or bung does not have a uniform taper complementary to the usual four degree taper of the bung hole, but is slightly convex somewhat spherically. The diameter of the convex portion of the plug exceeds the diameter of the corresponding portion of the bung hole. When the bung is driven into place, this convexity requires some displacement of the material in both axial directions from the line of maximum pressure, and the result is to establish three axially spaced lines of seal between the stopper and the bung hole plate.

The bung is hollow and opens into the barrel. Its walls are relatively thick but provided with a series of longitudinally extending openings of any desired cross section to admit to immediate proximity to the outer surface of the wall of the stopper any pressures existing in the barrel. In consequence of this arrangement, the greater the pressure, the tighter will be the seal between the bung and the bung hole plate.

The lines of seal may be increased if desired by peripherally ribbing or shouldering the external surface of the bung.

In the drawings:

FIG. 1 is a view in side elevation of a bung or stopper embodying the invention.

FIG. 2 is a view of the device in end elevation.

FIG. 3 is a view taken in axial section on the line 3—3 of FIG. 1.

FIG. 4 is a view similar to FIG. 3 showing the device in use, a portion of the bung hole plate being fragmentarily illustrated.

FIGS. 5 and 6 are fragmentary views similar to FIG. 4 and showing slightly modified embodiments of the invention.

The bung or stopper is made to fit the conventional bung hole **7** in the wall of a barrel, this usually constituting a separate plate **8**. The bung hole conventionally has a four degree taper.

The bung of the present invention is molded of polyethylene or other suitable synthetic resin. It is of such a length that when its base flange **9** engages the external surface of the wall portion **8** of the barrel, its peripheral rib **10** will just clear the inner surface **11** and will expand within the barrel, thus aiding in the retention of the bung in the bung hole.

The intervening wall portion **15** of the bung is tapered but desirably is not frusto-conical like the bung hole. Instead, it is desirably convex intermediate the ribs **9** and **10** as clearly appears in FIGS. 1 and 3. The bung is hollow, having an internal cavity **16** which opens to the inner end of the bung. The annular wall **17** around this

cavity has a generally cylindrical inner surface **18** and is quite thick, except toward the outer end thereof, where there is a shoulder **19** beyond which projects a relatively thin lip **20** tapering sharply from the rib **10** to guide the bung into the bung hole during the driving operation.

The thick part of the wall **17** is honeycombed with openings **25** which may be of any desired form but communicate with the interior of the barrel. Desirably they are holes of uniform cross section and very close together. The webs **26** between the openings provide strong reinforcement for the wall **17** within the convex portion **15** of the bung. At the same time, the openings admit into proximity to this convex portion of the wall of the bung all pressures developed in the barrel and to which the bung is subject. These pressures tend to expand the bung to increase its pressure engagement with the surface which defines the bung hole **7**. The outer or end wall **28** of the bung closes the interior cavity **16** thereof and also closes the several cells or holes **25** in the peripheral wall.

When the axially convex bung is driven into a frusto-conical bung hole, the material in the convex portion of the wall is forcibly displaced and the bung tends to bulge near the respective ribs **9** and **10**. Thus, pressure contact is established not only along the line of maximum convexity as indicated at **32** in FIG. 4, but additional lines of pressure contact are established at **33** and at **34**. As already noted, the pressure is increased in proportion to any pressures developed within the barrel, the increase being attributable to the admission of barrel fluids into the honeycombed openings **25**.

The modified embodiments of FIGS. 5 and 6 function in the same manner. The external contours and internal construction may be similar to those already described except that the lines of pressure contact between the bung and the wall defining the bung hole are multiplied. In FIG. 5, peripheral shoulders are provided at **29**. In FIG. 6, peripheral ribs are provided at **30**.

I claim:

1. A stopper having an inner cavity and a surrounding annular wall and a closed end, the annular wall being honeycombed with openings accessible to fluids under pressure to which the end of the stopper opposite its said end may be exposed, the stopper wall having an internal annular shoulder to which said openings extend and has a tapering lip about said shoulder and an external rib encircling the shoulder and from which said lip projects.

2. A stopper of synthetic resin comprising an annular wall and an outer closed end and an inner end at which said stopper has an interior cavity encircled by said wall, the wall being externally provided with ribs at opposite ends of the stopper and being axially convex externally between the said ribs and of progressively decreasing diameter from its outer end toward its inner end and being honeycombed with holes opening to the inner end of the stopper and sealed at the outer end thereof, said wall being provided internally with a shoulder at which said holes terminate and which is encircled by a lip projecting from the rib at the inner end of the stopper.

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